

A NEW SUBSPECIES OF *MEGACHEUMA BREVIPENNIS*  
(LECONTE) FROM SOUTHEASTERN CALIFORNIA  
(COLEOPTERA: CERAMBYCIDAE)

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ABSTRACT

A new subspecies of *Megacheuma brevipennis* (LeConte), *M. b. tiemanni* Hovore, is described from China Lake in southeastern California, and the nominotypical subspecies is briefly characterized. A second, apparently undescribed phenotype from extreme eastern California, represented by but a single specimen, is discussed but not named. Biological data for the new subspecies are summarized, and other species of Coleoptera coinhabiting the host plant are listed.

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The Cerambycid genus *Megacheuma* Mickel is comprised of a single wide-ranging species, *M. brevipennis* (LeConte), in which females have slightly abbreviated elytra and greatly distended (prior to oviposition) abdomens. Males have a more slender facies, with somewhat longer appendages, and are capable of strong, swift flight. Females have fully-developed flight wings, but apparently do not, or cannot, fly. Populations therefore tend to be somewhat colonial, with migration and dispersal most likely achieved primarily by terrestrial locomotion.

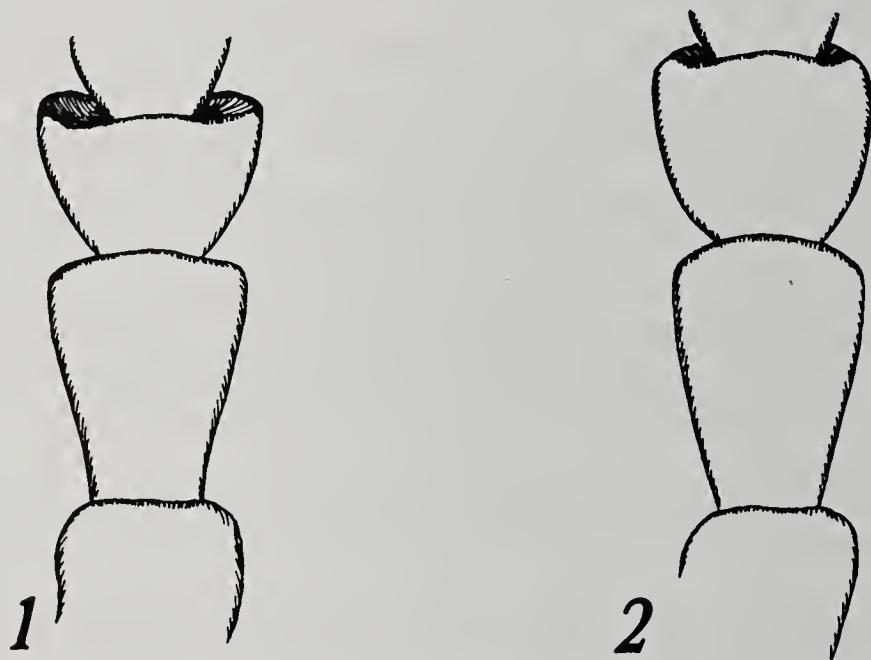
Specimens of *M. brevipennis* from scattered localities in the Great Basin regions of Idaho, eastern Oregon, north-central Nevada, and Utah are relatively constant in such characters as overall size range, body proportions (male antennal length displays some allometric growth trends), coloration, and elytral pattern configuration, with no evident populational differences of taxonomic significance. Despite the obvious potential for population isolation, the species seems to have remained remarkably stable over most of its range.

In the southernmost reaches of the Great Basin influence, in the so-called "Basin Ranges" of eastern California and adjacent Nevada, the geographical barriers are quite formidable, with even greater potential for population restriction, and two phenotypically distinct, apparently relict populations of *M. brevipennis* (described and discussed below) have recently been discovered in the China Lake and Fish Lake basins of California. The discovery of these populations suggests the possibility of the existence of additional unique phenotype segregates in the Saline, Panamint, and Death Valley basins, and in the isolated pleistocene basins of extreme southern Nevada.

*Megacheuma brevipennis tiemanni* Hovore, **new subspecies**

Male: Form similar to nominate subspecies, slightly more robust, elongate, dorsum slightly flattened; integument piceous-black, appendages light reddish-brown; pubescence short, dense, appressed, with scattered longer erect hairs, bright

lemon-yellow on body, whitish on appendages, margin of fifth abdominal sternite and (rarely) on head; elytral dark pattern consisting of three variable transverse bands, rarely attaining elytral margins, occasionally attaining suture, and an oblique subapical patch (one or more bands may be abbreviated or obscured by appressed yellow pubescence). *Head* with surface coarsely punctate, densely pubescent, antennae extending beyond middle of elytra, segments three and four subconical, about twice as long as apical width, thinly clothed with whitish hairs, segments five to eleven subserrate, poriferous, without whitish hairs, greatest length of fifth segment less than twice apical width. *Pronotum*, pro- and mesosternum densely clothed with yellow pubescence (subject to loss by abrasion) and longer erect hairs. *Elytra* slightly more than twice as long as humeral width, apices with outer angle acutely rounded or feebly dentate, obliquely truncated to suture. *Legs* moderately densely clothed with intermixture of depressed whitish hairs and suberect short black setae; pro- and mesotarsi broad, segments one and two subtriangular in dorsal outline, widest at apex, segment two about  $\frac{1}{4}$  wider than median length, sides evenly rounded from base to apex (Fig. 1). Abdomen densely yellow pubescent, sternites with at most a narrow glabrous area at base, apex of fifth sternite broadly subtruncate. Length (exclusive of abdomen): 11-16.5 mm.



Figs. 1-2, diagrammatic dorsal views of protarsal segments 1 and 2 of male *Megacheuma* (details of punctation and pubescence omitted): 1, *M. brevipennis tiemanni*; 2, *M. b. brevipennis*.

*Female*: Form very robust, broad, dorsum flattened; coloration as in male; antennae attaining basal one-third of elytra; elytra slightly abbreviated, about twice longer than humeral width; abdomen greatly distended, often exposing three or four tergites beyond elytral apices (subject to considerable shrivelling and distortion in dead specimens). Length (exclusive of abdomen): 13-20 mm.

*Holotype* male (California Academy of Sciences), allotype female (CAS) and 32 paratypes (8 males, 24 females) from "5 mi N China Lake, Kern County, California, el. 2181 ft," 14, 15 and 18 October 1965 (D. L. Tiemann) "on *Atriplex parryi*." Additional paratypes, 113 males, 144 females, all from China Lake (variously labelled as 5 mi N China Lake or simply "China Lake;" the actual type locality and area of most if not all subsequent collections is on G - 1 Road, near Tower 5, approximately 5 mi NNW of the Naval Base community of China Lake): 59 males, 86 females, 8 October 1972, 8 October 1978 (F. T. Hovore); 8 males, 23 females, 8 October 1972 (E. F. Giesbert); 18 males, 9 females, 8 October 1973, 6 October 1974 (J. M. Cicero); 11 males, 14 females, 8 October 1972 (D. G. Marqua); 17 males, 12 females, 12 October 1973 (A. J. Gilbert). Paratypes deposited in the following collections: California Insect

Survey, University of California, Berkeley; California Academy of Sciences; California State Department of Agriculture, Sacramento; Smithsonian Institution; Los Angeles County Natural History Museum; F. T. Hovore; E. F. Giesbert; D. G. Marqua; J. M. Cicero; D. Tiemann; J. Cope; A. E. Lewis; R. L. Penrose; R. L. Westcott; W. H. Tyson; J. E. Wappes; R. Surdick; R. H. Turnbow, Jr.

*Diagnosis and discussion:* *Megacheuma brevipennis tiemanni* is distinguished from the nominate subspecies by the paler appendages, entirely yellow body pubescence, and relative proportions of the tarsal segments (Figs. 1 & 2).

The salient diagnostic features of the typical form as herein restricted are enumerated as follows: integument piceous-black, femora piceous; dense appressed pubescence of head, prothorax, meso- and metasterna and abdomen grayish-white; greatest length of fifth antennal segment usually more than twice apical width; pro- and mesotarsal segments one and two moderately slender, second segment abruptly expanded from base to sides, sides subparallel to apex, only slightly wider than median length (Fig. 2); overall size range, exclusive of abdomen, Male: 10-14 mm.; Female: 9.5-15.5 mm.

The grayish-white body pubescence and darker appendages impart a strikingly different appearance to *M. b. brevipennis* when contrasted with *b. tiemanni*. Proportional differences in antennal segments and tarsal shape show moderate amounts of non-geographic variation in the material examined (including 93 specimens of typical *brevipennis*), and by themselves should not be considered absolutely diagnostic. Size ranges cited above for the two subspecies reflect parameters of variation consistent with those of other polytypic root-boring Cerambycidae (eg. *Crossidius hirtipes*). The low figure for female *tiemanni* (13 mm) is exceptional, the mean being above 16 mm, while the mean for female *b. brevipennis* is slightly less than 15 mm. In general, specimens of both sexes of *tiemanni* are visibly larger and more robust than are those of the nominate form. Measurements cited by Linsley (1964) evidently include the protruding portions of the abdomen, and are therefore somewhat greater than those given herein. In living females the abdomen is often turgid with ova, and in one 17 mm specimen (head to elytral apex) the abdomen protruded beyond the elytra an additional 12 mm. Postmortem shrivelling of the abdomen reduced the total body length of this specimen to 22 mm, a loss of 7 mm.

A single female specimen collected at the south end of the Fish Lake Valley, "7 mi S, 4 mi E Oasis, Inyo County, California," 30 August 1973 (D. Giuliani) (FTH) represents yet another distinctive and presumably isolated population of *Megacheuma*, but by itself is insufficient material upon which to base a new taxon. Briefly, it is characterized as follows: Form very robust; integument piceous-black with antennae, tibiae and tarsi dark reddish-brown; pronotal disc lacking dense appressed pubescence, longer erect hairs present; elytral pattern reduced, black bands complete across disc from margins to suture, pale appressed pubescence of elytra, margins of eyes and base of head lemon yellow, apical  $\frac{1}{2}$  of first four abdominal sternites and fifth tergite pale yellowish, and small patches on posterior margin of metepisternum silvery-white. Length (exclusive of abdomen): 16 mm.

*Biology:* Recorded host plants for *M. brevipennis* are *Sarcobatus vermiculatus* and *Atriplex* spp. (Linsley 1964; Barr & Penrose 1969). At the type

locality, *M. b. tiemanni* infests the living root-crowns and larger stems of *Atriplex parryi* Wats. In the China lake basin, *A. parryi* appears to have a rather restricted distribution, being concentrated primarily around the ancient pleistocene shoreline. Beetles were encountered over an extensive area of suitable habitat at the type locality, with the majority of specimens and infested plants having been located in broad depressions between sand ridges. cursory searches of superficially similar habitats several kilometers south and west of the type locality failed to locate any evidence of *Megacheuma* activity.

Female beetles were observed in presumed ovipositional posture, with the apical portion of the abdomen thrust downward into the sand adjacent to the root-crowns of *Atriplex*, but the actual mode of egg deposition was not determined.

Larvae bore parallel with the grain in the stems of the host plant, extending their galleries above and below the soil surface. Multiple infestations within a single stem are not unusual, with up to eight beetles having been reared from a single 30mm X 19cm root-crown section. Larval galleries are round or oval in cross-section, and are tightly packed with fine, grainy frass and fecula. No larvae were found during the period of adult activity, and the developmental cycle may require but a single season. R. L. Penrose (pers. comm.) states that *M. b. brevipennis* in Idaho and Oregon definitely has a two year period of larval development.

Adults of *b. tiemanni* spend the mid-morning and early afternoon (11 a.m.-2:30 p.m. PST) up in the foliage of the *Atriplex*. When approached they quickly dropped to the soil beneath the plant, where the females would attempt to burrow into the sand and debris at the base of the stem. Males ran swiftly out onto the open sand before taking flight. In the late afternoon (3 p.m.-4:30 p.m. PST), females retreated from the foliage to the bases of the plants, where they were located and mated with by one or more males. Although copulation and ovipositional posture were observed throughout the day, mating activities were much more prevalent in late afternoon. Females assumed ovipositional posture immediately following the termination of active copulation.

In early October 1972 and 1978, freshly dead and older, dried corpses of adult *Megacheuma* were found beneath the *Atriplex*, while at the same time a viable female pupa and numerous teneral adults were collected from within their pupal chambers. This would seem to indicate that the potential period of adult activity could extend over several months. Reared adults survived in refrigerated vials in the laboratory for over four months.

Also found breeding within the stems of *Atriplex parryi* were a large species of *Hippomelas* (Buprestidae) and *Metaponium convexicolle* (LeConte) (Tenebrionidae).

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## LITERATURE CITED

- BARR, W. F. AND R. L. PENROSE. 1969. Notes on the distribution and bionomics of some Idaho Cerambycidae (Coleoptera). *Great Basin Naturalist* 29(2):88-95.
- LINSLEY, E. G. 1964. The Cerambycidae of North America, Pt. V, Taxonomy and Classification of the subfamily Cerambycinae, Tribes Callichromini through Ancylocerini. Univ. Calif. *Publs. in Entomol.* Vol. 22, 197 pp.



## BOOK REVIEWS

**The new view of the earth:** Moving continents and moving oceans. By Seiya Uyeda. 1978. W. H. Freeman & Co., 660 Market St., San Francisco, CA 94104. 217 p., 88 illust., \$12.00 (cloth), \$8.00 (paper).

**Earthquakes:** A primer. By Bruce A. Bolt. 1978. W. H. Freeman [as above]. 244 p., 66 illust., \$12.00 (cloth), \$7.00 (paper).

**Earth.** Second edition. By F. Press & Siever. 1978. W. H. Freeman [as above]. 649 p., 674 illust., \$16.95 (cloth).

At one point, I intended to attempt critical reviews of one or more of these, but this would be silly. Some general impressions regarding value to our own readers should suffice—especially since these volumes are obviously very fairly priced. All are attractive, competently produced, and presented at a level that is enjoyable regardless of one's background.

Uyeda's book I read in its entirety several months ago. Thoroughly enjoyable, largely quite understandable, written with a highly personal input. This book will be of interest to many Coleopterists, especially those interested in biogeography. Chapters are: (1) The theory of continental drift: Its birth, death, and revival; (2) The exploration of the ocean floor; (3) The hypothesis of the spreading ocean floor; A synthesis; (4) Plate tectonics; (5) Island arcs; and (6) The new view of the earth.

Bolt's book I extended but a passing glance. This book would seem to have less direct application for Coleopterists, aside from those who have direct interest in the subject and those who live in earthquake zones! For those who ready Uyeda's book and wish to learn more about some of the casual processes of plate tectonics, Bolt's book would be a handy companion piece. Eleven chapters cover the following: (1) where earthquakes occur; (2) what they feel like; (3) faults; (4) causes; (5) earthquakes, volcanoes, and tsunamis; (6) measuring; (7) size; (8) stimulation by water; (9) events that precede an earthquake; (10) self-protection; and (11) damage control.

"Earth" is an introductory college-level text, written in a quite palatable manner. Three basic sections, each with several chapters, cover (1) historical geology, (2) surface processes, and (3) internal process. I suspect most Coleopterists are not going to need this book, but if you have an interest yet lack knowledge about geology, then you will.

—D. R. W.